

## City of Bryan, Texas

### Water Distribution System Master Plan

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*Gretchen N. Williams*  
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# *Report*



# Executive Summary

# EXECUTIVE SUMMARY

In keeping with the City's goal of providing adequate quantities of drinking water at sufficient pressures, the City of Bryan retained CDM to perform a Water Distribution System Master Plan.

The primary tasks for the project include:

- 1) Update the computerized hydraulic model of the distribution system and evaluate the existing water system.
- 2) Evaluate location and patterns of demand within the service area.
- 3) Evaluate the water systems ability to meet increased demands.
- 4) Develop a capital improvements program for timely implementation of the proposed improvements.

The Master Plan will function as a roadmap for City Staff to implement existing system improvements and accommodate future growth and development. The project limits and the current Certificate of Convenience and Necessity boundary are indicated on Figure 1. A Certificate of Convenience and Necessity (CCN) is authorization by the TNRCC to provide water or sewer utility service to a specific area and obligates the utility to provide continuous and adequate service to every customer who requests service in that area. The future service limits established for the Water Distribution System Master Plan encompass water utility providers outside of the City of Bryan's CCN. It should not be construed from the inclusion of the adjacent water utility providers in the future service area that the City of Bryan's strategy is to take-over these areas. The adjacent water utility providers are considered in the estimate of water supply demands to provide an upper-limit water projection value.

The City of Bryan's water distribution system capacity is in relatively good shape. The existing system meets the Texas Natural Resource Conservation Commission (TNRCC) Water System Criteria for pumping rates, storage facility capacity and pressure requirements. Like most water systems today, many of the City of Bryan's existing waterlines are old and small by today's standards and need to be replaced, rehabilitated or supplemented.

The total water produced in year 2000 was 4 billion gallons, which served a population of 65,660. On average almost 11.0 million gallons of water per day were consumed in year 2000. Water usage in Bryan has increased 21% from Year 1990 to year 2000, while the population has increased 16% over the same period. On July 20, 2000, the largest daily water demand

(referred to as “maximum day”) occurred reaching 20.3 million gallons. The hour in which the highest water demand occurred was from 8:00 to 9:00 pm and reached a peak hour rate of 33 million gallons per day.

From the existing water system evaluation several improvements are recommended. Transmission mains in the North and Northeastern portions of the City are needed for adequate pressure during peak usage and fire protection. The addition of an elevated storage tank (1.0 MG) in the Northeastern portion of the City is also recommended to aid in pressure maintenance and fire flow in the area. If the proposed elevated storage tank is on-line by Year 2003, Bryan will meet the TNRCC elevated storage tank criteria of 200 gallons/connection. By meeting the 200 gallons/connection, the City of Bryan is eligible for a lower TNRCC high service pumping criteria of 0.6 gallons per connection. The overall existing system improvements are shown on Figure 5.1.

The opinion of probable cost for the immediate system improvements is \$11.3 million. This cost includes construction, engineering, surveying and testing. It does not include costs associated with right-of-way acquisition, and funding or interest costs.

A fire flow analysis was performed for the existing system peak day condition through the hydraulic model. Three fire flow scenarios were evaluated system wide: 500 gpm, 750 gpm, and 1,000 gpm. Site-specific fire-flows were simulated for the Brazos Center, Brazos Industrial Park and Bryan Industrial Park. Fire flows of at least 2,000 gpm can be achieved, and connections to looped 12-inch lines results in fire flows more than 3,000 gpm. The immediate improvements presented above were assumed to be in place prior to the fire flow analysis. Indicated on Figure 5.2 are the locations where improvements are needed to meet each of the fire flow scenarios. Approximately \$360,000 is needed to upgrade the water system so that at least 500-gpm fire flow is provided in the modeled system. An additional \$1 million dollars are needed to bring the system up to 750-gpm fire flow.

Future water projections were prepared from an evaluation of historical water consumption and population figures. Listed below are projections of average day and max day demands.

<b>Year</b>	<b>Average Day Demand (million gallons)</b>	<b>Maximum Day Demand (million gallons)</b>
2005	12.0	24.0
2010	12.9	25.9
2020	14.9	29.7
2025	15.7	31.4

Improvements needed for Year 2005 are a result of the projected growth and development within Bryan. Based on the population projections and anticipated growth the southwestern portion and the northeastern portion of Bryan will need additional water distribution system facilities. The improvements are shown on Figure 5.3 and listed below:

- 1) Transmission mains for the proposed Hwy 47 and surrounding area.
- 2) Distribution system lines near the Copperfield Area
- 3) Distribution system line to interconnect transmission mains east of Highway 6.

The opinion of probable cost for the proposed Year 2005 improvements is \$16.3 million. This cost includes construction, engineering, surveying and testing. It does not include costs associated with right-of-way acquisition, and funding or interest costs.

Improvements needed for Year 2010 are also a result of the projected growth and development within Bryan. It is projected that the average day demand will reach almost 13.0 MGD in Year 2010, with the max day almost reaching 26 MGD. Based on these increased water demands Bryan will need additional elevated water storage facilities (1.0 MG) and distribution system line to interconnect transmission mains north of Highway 6 as shown on Figure 6.

The opinion of probable cost for the proposed Year 2010 improvements is \$18.3 million. This cost includes construction, engineering, surveying and testing. It does not include costs associated with right-of-way acquisition, and funding or interest costs.

Most of the major infrastructure will be in place for transmission of the year 2020 demands. However, additional miscellaneous distribution system lines are needed to meet the specific demand areas. Year 2020 opinion of probable cost is \$1.6 million.

The findings and recommendations contained in this study are valid as of the date of this report and the information referenced herein. Changes in the growth and development within the study area or regulatory changes may affect the conclusions and recommendations presented in this report.